

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Office Action dated March 29, 2004. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

Claims 1-4, 6-10, 13, and 5-25 are under consideration in this application. Claims 5, 11-12 and 14 are being cancelled without prejudice or disclaimer. Claims 1-3, 6, 10, 13, 15-17, 19-20 and 24 are being amended, as set forth above, in order to more particularly define and distinctly claim Applicants' invention. A new claim 25 is being added to recite other embodiments described in the specification.

Additional Amendments

The claims are being amended to correct formal errors and/or to better disclose or describe the features of the present invention as claimed. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Formality Rejection

Claims 1-24 were rejected under 35 U.S.C. § 112, second paragraph, on the grounds of failing to clearly define the subject matter. As indicated, the claims have been amended as suggested or required by the Examiner. In particular, claims 1 and 16 now recite all essential elements/structure, and the recitation "wavelength error signal" has been eliminated. Accordingly, the withdrawal of the outstanding informality rejections is in order, and is therefore respectfully solicited.

Prior Art Rejections

Claims 1-7 and 11-15 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,477,190 to Komiyama (hereinafter "Komiyama"), and claims 16-21 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,825,792 to Villeneuve et al. (hereinafter "Villeneuve"). Claims 1, 8-10 were further rejected under 35 U.S.C. § 103(a) as being unpatentable over Komiyama in view of U.S. Patent App. No.

2002/0163650 by May (hereinafter "May"), and claims 16, 22-24 were rejected as being unpatentable over Villeneuve in view of May. These rejections have been carefully considered, but are most respectfully traversed.

The optical module of the invention, as recited in the new claim 25 (e.g., Figs. 1 and 5), comprising: a substrate 300; a semiconductor laser 100; a beam splitter 106 which divided a light emitted from said semiconductor laser 100 into a transmitted light 107 and a reflected light; an etalon 108 through which the transmitted light 107 from said beam splitter 106 is transmitted, at least said semiconductor laser 100 and said etalon 108 being disposed on and in contact with said substrate 300 (Fig. 8); a first optical detection means 109 which receive the light transmitted through said etalon 108; a second optical detection means 110 which receive the reflected light from said beam splitter 106; and temperature control means 401 provided underneath and in contacting with the substrate 300. In particular, the shortest distance h from a fixed end of said etalon 108 on said substrate to an optical axis of the light transmitting through said beam splitter 106 and said etalon 108 ranges from one-twenties fold through four fold of said light's radius, i.e., $a/20 < h < 4a$ (p. 16, line 7).

The invention, as now recited in claim 1, is also directed to an optical module containing all elements of claim 25, and further comprising: a temperature control means (e.g., the electronic refrigeration (Peltier) element 401 in Fig. 8) for controlling a temperature of said etalon 108 and said semiconductor laser 100, respectively within a predetermined range by way of said substrate 300; a circuit (See attached explanatory drawing) for obtaining a difference between a photoelectric current P_t of said first optical detection means 109 and a photoelectric current P_m of said second optical detection means 110; and a switch 405 which switches the circuit from a temperature control loop 488 to a wavelength control loop 489 after setting an operating temperature of said semiconductor laser 100. In particular, said temperature control means 430 controls the temperature of said etalon 108 and said semiconductor laser 100 so that the difference between a photoelectric current P_t of said first optical detection means 109 and a photoelectric current P_m of said second optical detection means 110 becomes zero or constant, when said switch 405 switches the circuit from the temperature control loop 488 to the wavelength control loop 489 (p. 9, line 23 to p. 10, line 9; p. 7, line 25 to p. 8, line 13).

The invention, as now recited in claim 16, is also directed to an optical module containing all elements of claim 1, but for a narrower range for the shortest distance h as one-tenth fold through two fold said light's beam radius a , i.e., $a/10 < h < 2a$ (p. 16, line 7).

Applicants contend that none of the prior art references teach or suggest such "a shortest distance h from a fixed end of said etalon 108 on said substrate to an optical axis of the light transmitting through said beam splitter 106 and said etalon 108 ranging in $a/20 < h < 4a$ (claims 1 and 25) or $a/10 < h < 2a$ (claim 16)" as the invention.

Such a distance requirement was introduced to reduce temperature dependency of the etalon 108. As long as the light-beam transmits through the lower portion of the etalon 108, closer to the substrate 300 and precisely, through the upper portion of the protrusive portion 197 of the substrate 300, the electric refrigeration device 401 contacting the substrate 300 facilitates abating the temperature dependency of the etalon 108 (p. 15, line 15 to p. 16, line 16; Fig. 8). The temperature dependency range in the upper portion of the etalon 108 is larger than that in the lower portion of the etalon 108, due to the fact that the upper portion is farther from the substrate 300 contacting the electric refrigeration device 401. Especially, the present invention including the distance of " h " can fully resolve the issue for ITU-T to provide a semiconductor laser module which can transfer wavelengths to the ITU-T (International Telecommunication Union-Telecommunication Standardization Sector) grid as randomly selected and lock the same wavelengths (p. 2, lines 9-24; p. 23, lines 11-16). The wavelength intervals are very narrow, therefore it is required that the wavelength of the laser source be constant with precision. The prior art feedback circuit is simply unsatisfactory for this aim.

In contrast, as relied upon by the Examiner, Komiyama's Figs. 22 and 23 merely show the axis of the laser 10 is set in an upper part of the optical filter 23, but not in a lower portion of the optical filter 23 at all. Komiyama simply fails to teach or suggest any range for such an " h ." Neither Villeneuve nor May compensate for such deficiencies.

Although the invention applies the general cooling mechanism as disclosed in Komiyama (an etalon 23 on top of a mount carrier 17-2 then a thermo-electric cooler (TEC) element 14-2 in Fig. 23), the invention applies the cooling mechanism in conjunction with arranging an optical axis of the light transmitting through said etalon 108 to be close to the electric refrigeration device 401 such that h ranges in $a/20 < h < 4a$ or $a/10 < h < 2a$, to achieve unexpected results or properties. For example, the present invention including the distance of

"h" can fully resolve the issue for ITU-T. The presence of these unexpected properties is evidence of nonobviousness. MPEP§716.02(a).

"Presence of a property not possessed by the prior art is evidence of nonobviousness. In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963) (rejection of claims to compound structurally similar to the prior art compound was reversed because claimed compound unexpectedly possessed anti-inflammatory properties not possessed by the prior art compound); Ex parte Thumm, 132 USPQ 66 (Bd. App. 1961) (Appellant showed that the claimed range of ethylene diamine was effective for the purpose of producing " 'regenerated cellulose consisting substantially entirely of skin' " whereas the prior art warned "this compound has 'practically no effect.' ").

Although "[t]he submission of evidence that a new product possesses unexpected properties does not necessarily require a conclusion that the claimed invention is nonobvious. In re Payne, 606 F.2d 303, 203 USPQ 245 (CCPA 1979). See the discussion of latent properties and additional advantages in MPEP § 2145," the unexpected properties were unknown and non-inherent functions in view of Komiyama, since Komiyama does not inherently achieve the same results. In other words, these advantages would not flow naturally from following the teachings of Komiyama, since Komiyama fails to suggest applying the "h" requirement.

Applicants further contend that the mere fact that one of skill in the art could arrange the elements of Komiyama to meet the terms of the claims is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for one skilled in the art to provide the unexpected properties, such as fully resolving the issue for ITU-T, without the benefit of appellant's specification, to make the necessary changes in the reference device. *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984). MPEP§2144.04 VI C.

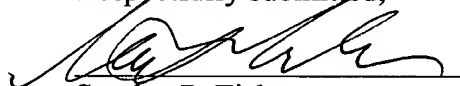
Applicants contend that neither Komiyama, Villeneuve, May, nor their combination teaches or discloses each and every feature of the present invention as disclosed in independent claims 1, 16 and 25. As such, the present invention as now claimed is distinguishable and thereby allowable over the rejections raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

Conclusion

In view of all the above, Applicants respectfully submit that certain clear and distinct differences as discussed exist between the present invention as now claimed and the prior art references upon which the rejections in the Office Action rely. These differences are more than sufficient that the present invention as now claimed would not have been anticipated nor rendered obvious given the prior art. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application as amended is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicant's undersigned representative at the address and phone number indicated below.

Respectfully submitted,



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